

SPORTS HIP 16

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SPEAKER NOTES

Stefan Fickert

WARWICK orthopaedics

WARWICK orthopaedics

SPORTS INJURY CONFERENCES

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27TH & 28TH JUNE 2016

THE NATIONAL FOOTBALL CENTRE, ST GEORGE'S PARK

www.sports-surgery.org

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PROFESSOR OF TRAUMA & ORTHOPAEDIC SURGERY

UNIVERSITY OF WARWICK

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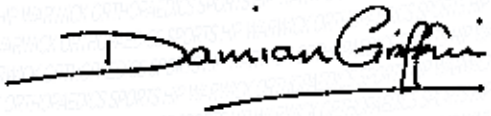
Dear Colleague,

The Sports Hip Conference will run again in 2018 as part of our portfolio of Sports Injury conferences. Some of you may have already attended the Sports Foot & Ankle, Sports Shoulder and and Sports Knee conferences. The dates for the next events will shortly be published on our website
www.sports-surgery.org

The key feature of these Sports Injury conferences is that we explore the latest ideas and most difficult problems in a relatively small group, guided by an expert international faculty.

Please do let us know if you have any thoughts about the meeting or any suggestions as to how we might develop it in the future.

With very best wishes.



PROFESSOR DAMIAN GRIFFIN
PROFESSOR OF TRAUMA & ORTHOPAEDIC SURGERY
UNIVERSITY OF WARWICK

WARWICK orthopaedics
SPORTS INJURY CONFERENCES
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Stefan Fickert



Stefan Fickert is Adjunct Professor of Trauma and Orthopaedic Surgery at the Faculty of Medicine at Heidelberg University and a partner at the Sporthopaedicum in Straubing and Regensburg as well as the St Wolfgang Clinic in Bad Griesbach, Bavaria. His special interests include joint preservation and hip prosthetics.

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Session 4

HIP CARTILAGE

AMIC, MACI, spheroids, gels, PRP and stem cells: how to choose?

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CONTACT THE AUTHOR

AMIC, MACI, spheroids, PRP and stem cells: How to choose ?

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sporthopaedicum straubing regensburg

Medical Faculty Mannheim
University of Heidelberg

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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?



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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?

Best cartilage therapy

Treat the underlying pathology



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straubing

Cartilage hip

Results after Microfracture

Typ of Study	Pat number	FU/m	Results	complications/ conversions	Author
Case series	37	24	**PRO** Signifikant	2 HTEP, 1 Re HASK	Domb 2014
Retrospective Case series	17	24	**RTP** 32 %		Mc Donald 2013
Retrospective Case controlseries	94	36	**RTP** 76% MFX und 84% Kontroll		Mc Donald 2013
Case series	20	17	**Re- ASK** 96% Filling		Karthikeyan 2012
Case series	9	20	**Re- ASK** 91 % Pat. complete Filling	1 HTEP after 66 Months	Philippon 2008

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Cartilage hip

Results after Microfracture

A Matched-Pair Controlled Study of Microfracture of the Hip With Average 2-Year Follow-up: Do Full-Thickness Chondral Defects Portend an Inferior Prognosis in Hip Arthroscopy?

Benjamin G. Domb, M.D., John M. Redmond, M.D., Kevin F. Dunne, B.S., Christine E. Stake, M.A., and Asheesh Gupta, M.D., M.P.H.

Pat. **MFX 49 Pat.** **Control 98**
FU **27 Months (17-49)**

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Cartilage hip

Results after Microfracture

Hip Procedure	Prevalence: Microfracture Group	Prevalence: Control Group
Arthroscopic osteoplasty (cam-type FAI)	93	86
Acetabuloplasty (pincer-type FAI)	51	61
Labral repair	56	56
Ligamentum teres debridement	67	63
Removal of loose body	24	11
Synovectomy	17	25
Labral debridement	44	44
Iliopsoas release	26	22
Capsular repair	15	13
Capsular release	85	87
Debridement of trochanteric bursitis	9	10

Outcome Score	Microfracture Group	Control Group	*P* Value
mHHS	56.6	59.8	.13
NAHS	52.3	54.4	.24
HOS-ADL	58.4	60.9	.22
HOS-SSS	34.8	38.8	.15

Domb, Arthroscopy April 2015

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Cartilage hip

Results after Microfracture

Variable	Average Preoperative Score	Average Postoperative 2-Year Follow-up Score	*P* Value
Microfracture Group			
mHHS	56.6	74.2	< .001
NAHS	52.3	71.2	< .001
HOS-ADL	58.4	74.2	< .001
HOS-SSS	34.8	57.7	< .001
Control Group			
mHHS	59.8	79.5	< .001
NAHS	54.4	76.3	< .001
HOS-ADL	60.9	80.5	< .001
HOS-SSS	38.8	65	< .001

Defect Size ?

Domb, Arthroscopy April 2015

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Cartilage hip

Results after Microfracture

Clinical
Low evidence studies
Different therapeutic procedures
Defect size ?
Follow up time Hip max. 6 J., 66% < 3J.
Knee > 16 J.

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Cartilage hip

Results after Microfracture

Basic science

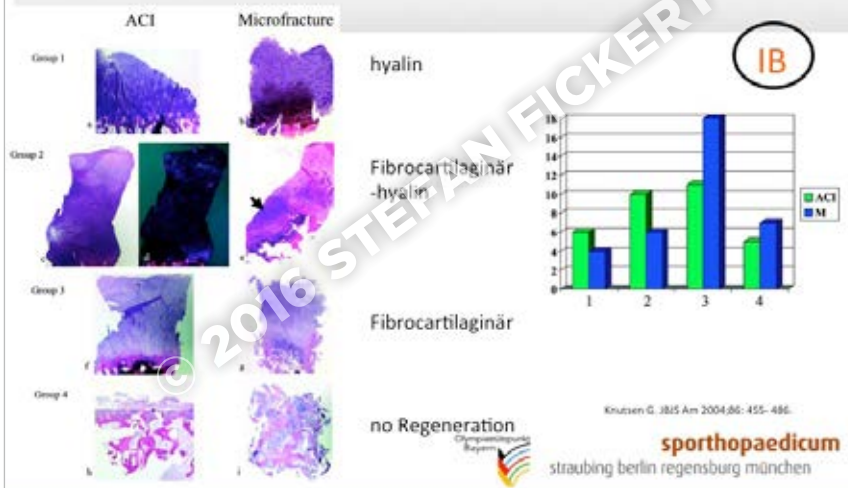
- Hyperossification after MFX
- Fibrocartilage formation
- Detoriation mechanically suboptimal repair tissue
- Fracture subchondral bone plate

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Cartilage Knee

ACI vs. Microfracture



Knutsen G. JBJS Am 2004;86: 455- 486.

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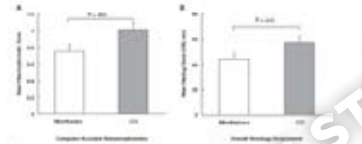
Cartilage Knee

Mikrofracture

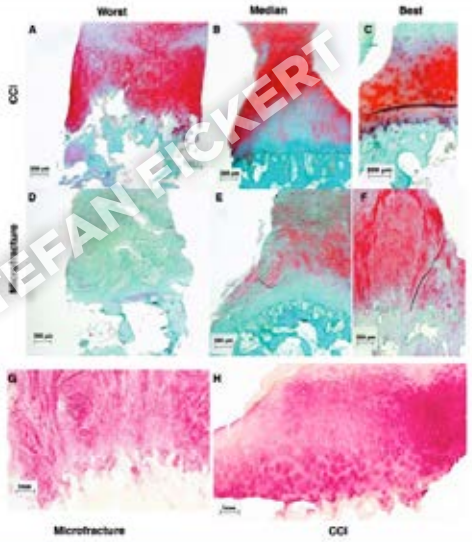
CCI

Saris 2008

Safranin O



Kollagen II



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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?

Natural History

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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?

Regenerative capacity chondrocytes
Philosophies

In vivo stimulation
AMIC

Cell

in vitro expansion
MACI spheroids

Cell free
Optimization homeostasis
PRP

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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?

Autologous matrixinduced chondrogenesis

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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?

AMIC





c/o Fritz Thorey

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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?

Sustained five-year benefit of autologous matrix-induced chondrogenesis for femoral acetabular impingement-induced chondral lesions compared with microfracture treatment

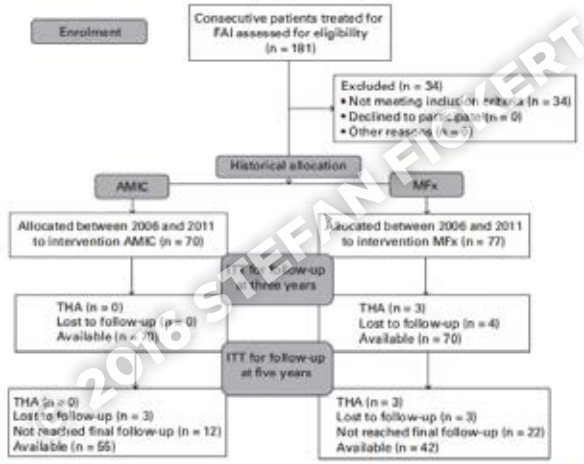
A. Fontana,
L. de Girolamo

Bone Joint J 2015; 97-B:628–35.

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AMIC



Bone Joint J 2015; 97-B:628–35.

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AMIC

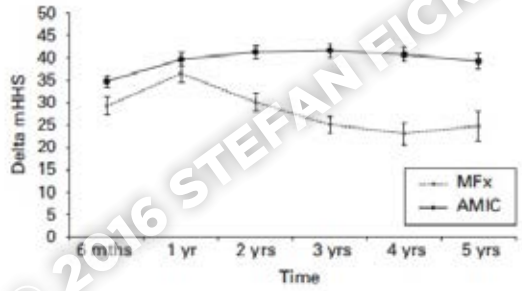
	MFx	AMIC	p-value
Number	77	70	
Gender (M/F)	55/22	36/34	0.017
FAI-cam (n)	59	42	0.034
FAI-pincer (n)	6	13	0.083
FAI-combined (n)	12	15	0.399
Pre-operative mean age (yrs)	39.3 (19 to 55)	39.1 (18 to 55)	0.855
Pre-operative mean defect size (cm^2)	3.7 (2 to 8)	3.6 (2 to 8)	0.356
Pre-operative mean mHHS	47.1 (36 to 60)	44.7 (34 to 60)	0.011
Large defects ≥ 4 cm^2 (n, %)	35 *(45.4)*	27 *(38.6)*	0.409

Membran: Chondro-Guide

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AMIC

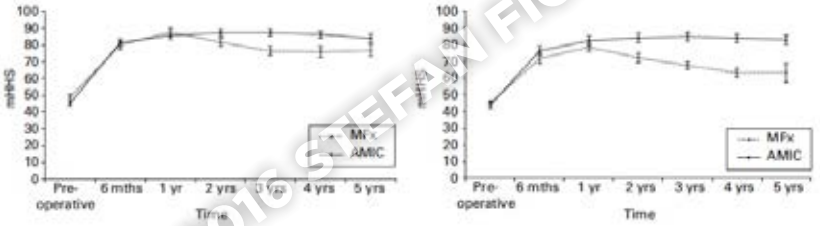


DELTA

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AMIC
Defect size



≤ 4cm ²

> 4cm ²

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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?

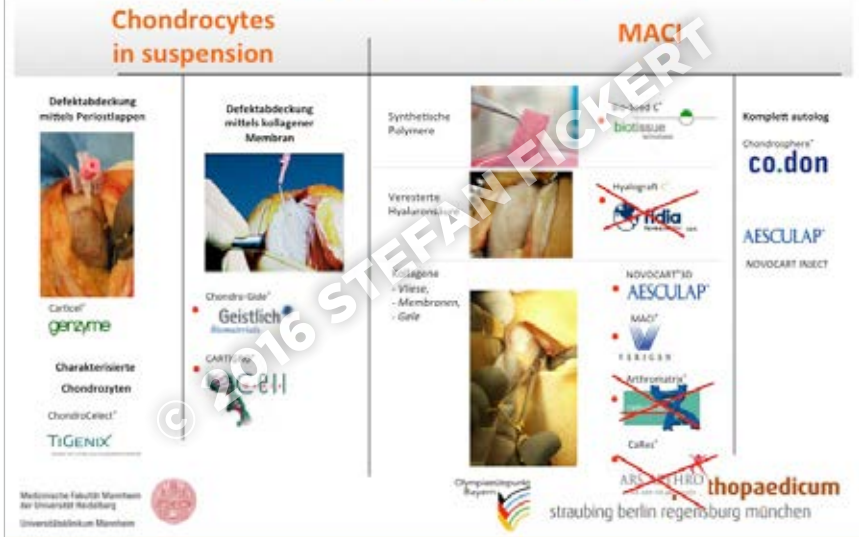
Matrixassociated autologous chondrocyte implantation

Spheroids
Gels

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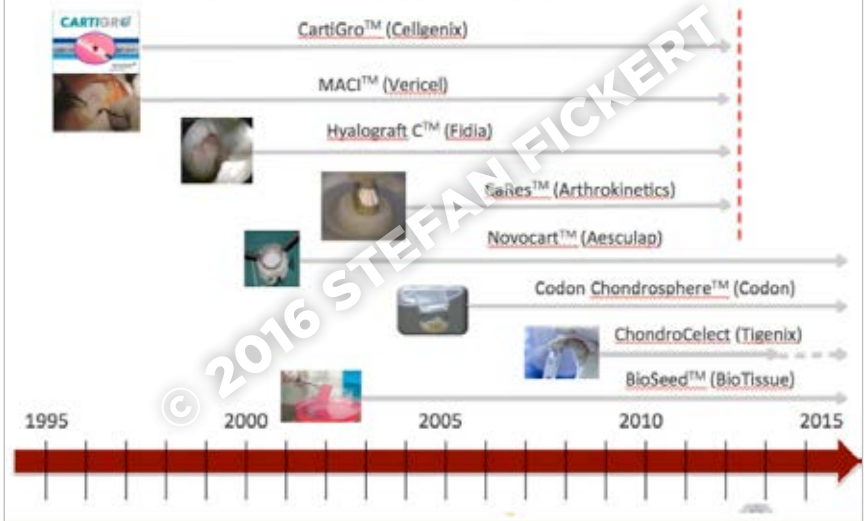
ACI Generations



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ACT Produkte in Deutschland (1995 – 2015)



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Cartilage therapy- EU drug approval studies

	Novocart (Tetec)	Chondrosphere (Co.don)	MACI (Vericel)	ChondroCelect (Tigenix)
Design	RCT vs. MF	RCT vs. MF	RCT vs. MF	RCT vs. MF
Status	Recruiting	Recruitment Completed Januar 2015	Finished	Finished
Publications		Phase II results ICRS 2015 & submitted Phase III 2016/17	Saris et al., 2013 (1y)* Saris et al., 2014 (2y)	Saris et al., 2008 (1y)* Saris et al., 2009 (2y) Vanlauwe et al., 2011 (5y)
Approval			2013	2011
Status			Sold to Vericel (US) No sales in EU	Reimbursement in D problematic Sales in EU mainly BE, NL

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MACI Hip studies

Arthroscopic Treatment of Hip Chondral Defects: Autologous Chondrocyte Transplantation Versus Simple Debridement—A Pilot Study

Andrea Fontana, M.D., Alessandro Bistolfi, M.D., Maurizio Crova, M.D., Federica Rosso, M.D., and Giuseppe Massazza, M.D.

Arthroscopy: The Journal of Arthroscopic and Related Surgery, Vol 28, No 3 (March), 2012: pp 322-329

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MACI Hip studies

Fontana, et al. AJSM 2012

Evidenzlevel:	Level III, retrospektive Vergleichsstudie
Patientenanzahl:	15/15
FU in Monate:	74
PROs:	HHS
Gruppe A:	Bioseed-C
Gruppe B:	Mikrofrakturierung
Lokalisation	
Acetabulum	15
Femur	2



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MACI Hip studies

Fontana, et al. AJSM 2012

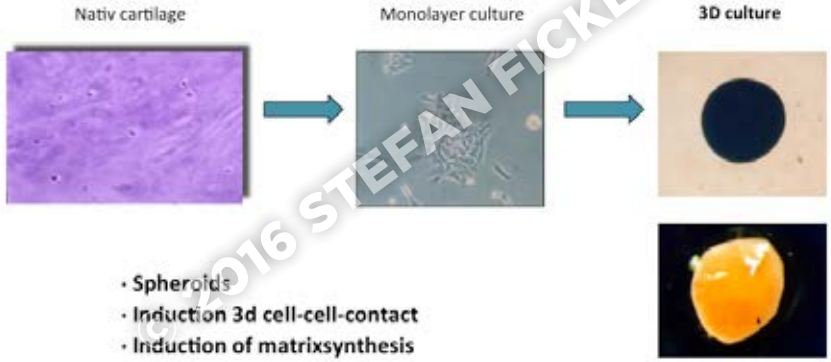


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Spheroids

Basics



- Spheroids
- Induction 3d cell-cell-contact
- Induction of matrixsynthesis

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Spheroids

ARTHROSCOPY AND SPORTS MEDICINE

Feasibility of arthroscopic 3-dimensional, purely autologous chondrocyte transplantation for chondral defects of the hip: a case series

S. Fickert · T. Schottenberg · M. Niks · C. Weiss · S. Thier

HIP

Arthroscopic three-dimensional autologous chondrocyte transplantation using spheroids for the treatment of full-thickness cartilage defects of the hip joint

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Spheroids Gel



High AL — Implant

AL — Camera

Posterolateral — drain

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Technique Chondrosphere



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Technique Chondrosphere



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Technique Chondrosphere



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Gel

Novocart Inject

in-situ polymerising Albumin-Hyaluronacidgel
Crosslinking Polyethylenglycol, BMP-2, Insulin

Characterised autologous chondrocytes

Homogenous distribution
Polymerisation 20-40 sec.





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Technique Novocart Inject



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Gel

Results after Novocart Inject

Evaluationsinstrumente:	International Hip Outcome Tool (iHOT 33) EQ-5D Non Arthritic Hip Score (NAHS)
AE/ SAE:	SOC und PT der MedDRA
Zeitpunkt:	6 w, 3, 6, 12 m

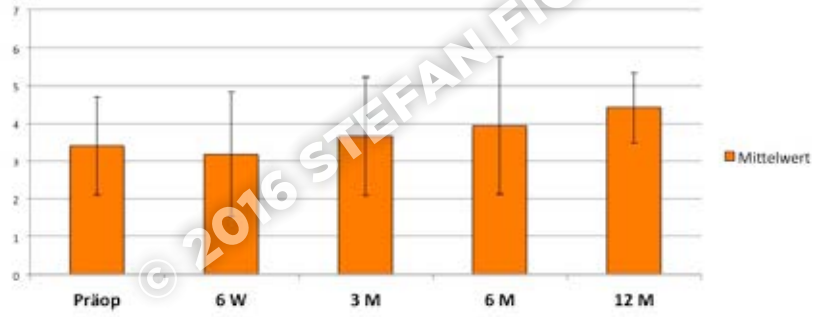
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Gel

Results after Novocart Inject

NAHS



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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?

Regenerative capacity chondrocytes

Predictors in cartilage therapy ?

Defect size, containement
Bone defect
Concomitent labral pathologies
Activity, age

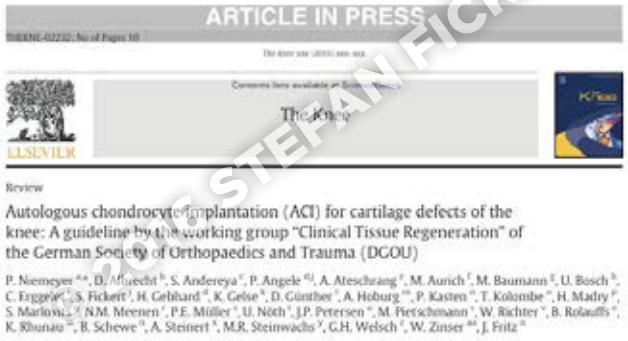
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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?

Guideline German Society of Orthopaedics


ARTICLE IN PRESS

The Knee

ELSEVIER

Review

Autologous chondrocyte implantation (ACI) for cartilage defects of the knee: A guideline by the working group "Clinical Tissue Regeneration" of the German Society of Orthopaedics and Trauma (DGOU)

P. Niemeyer [a,*], D. Albrecht [b], S. Andereya [c], P. Angele [d,j], A. Ateschrang [e], M. Aurich [f], M. Baumann [g], U. Bosch [h], C. Erggelet [i], S. Fickert [j], H. Gebhard [d], K. Gelse [k], D. Günther [l], A. Hoburg [m], P. Kasten [n], T. Kolombe [o], H. Madry [p], S. Marlovits [q], N.M. Meenen [r], P.E. Müller [s], U. Nöth [t], J.P. Petersen [u], M. Pietschmann [v], W. Richter [w], B. Rolauffs [x], K. Rhunau [m], B. Schewe [y], A. Steinert [z], M.R. Steinwachs [y], G.H. Welsch [r], W. Zinser [aa], J. Fritz [ab]

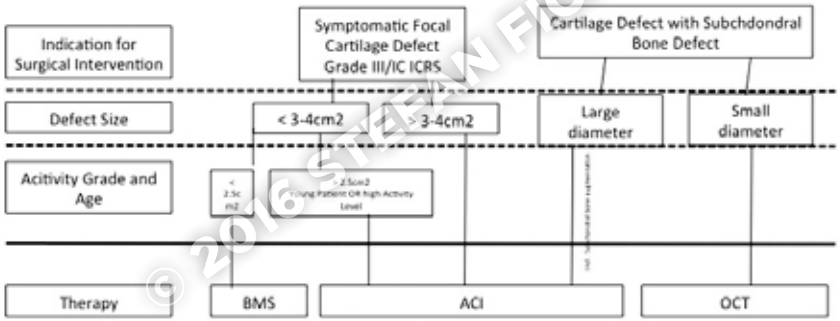
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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?

Guideline German Society of Orthopaedics



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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?

Anatomy

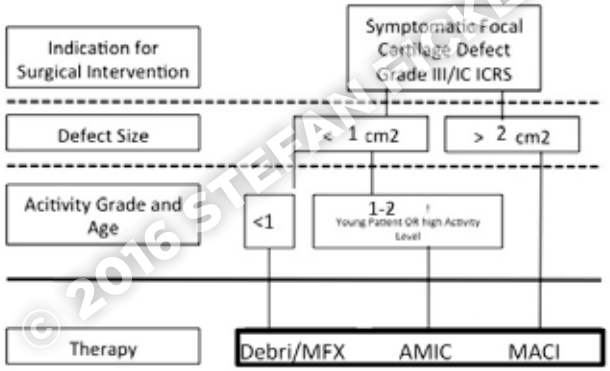
		Acetabulum	Knee
Surface	w/o Labrum	29 cm^2	60-130 cm^2
	w Labrum	37 cm^2	
Weight bearing contact area		14 cm^2	

Tan, Am J Orthop, 2001
Greenwald, Biomechanics, 1971

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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?



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Stem cells

Adipose derived, BM derived
EU legislative

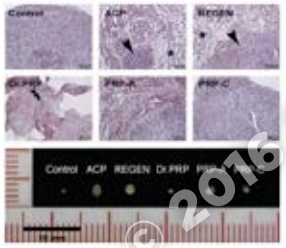
No clinical therapy

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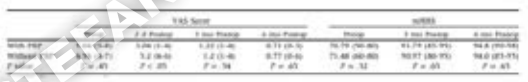
PRP

Platelet-Rich Plasma Preparation Types Show Impact on Chondrogenic Differentiation, Migration, and Proliferation of Human Subchondral Mesenchymal Progenitor Cells



Platelet-Rich Plasma Augmentation of Arthroscopic Hip Surgery for Femoroacetabular Impingement: A Prospective Study With 24-Month Follow-up

Claudio Rafols, M.D., Juan Eduardo Monckeberg, Ph.D., M.D., Jorge Numair, M.D., Jose Botello, M.D., and Julio Rosales, M.D.



Arthrosocopy 2015

< 2 d less pain
No effect

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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?

MACI, spheroids, gels

2 case series

1 retrospective controlled study

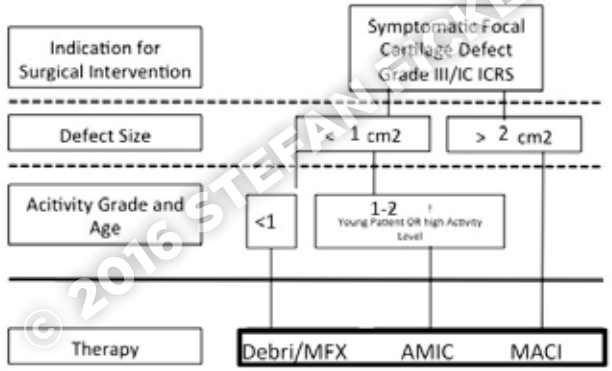
Low scientific evaluation

Short FU, various cofactors

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AMIC, MACI, spheroids, PRP and stem cells: How to choose ?



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DGOU Deutsche Gesellschaft für Orthopädie und Unfallchirurgie

KNORPEL REGISTER

bei Interesse:
info@knorpel-register.info



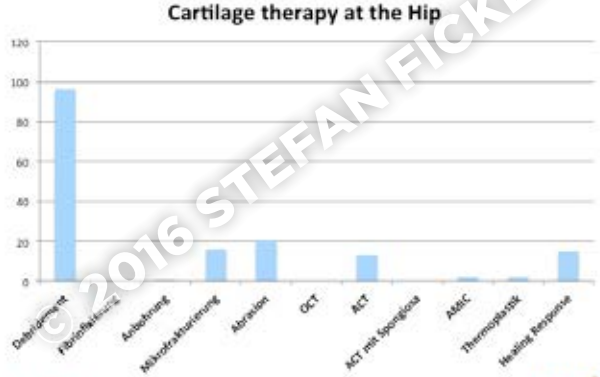
Eine multizentrische Datenbank zur Registrierung von Patienten nach Knorpeltherapien
der AG Klinische Geweberegeneration der DGOU
Hüfte – Knie - Sprunggelenk

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DGOU Deutsche Gesellschaft für Orthopädie und Unfallchirurgie

KNORPEL REGISTER



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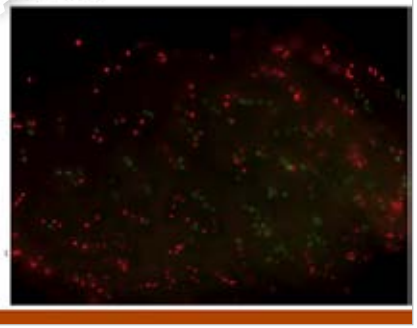
Knorpeltherapie am Hüftgelenk

Refixation Fibrin

Biochemical and Cellular Assessment of Acetabular Chondral Flaps Identified During Hip Arthroscopy

Sanaz Hariri, M.D., Jeremy Truntzer, M.D., Robert Lane Smith, Ph.D., and Marc R. Safran, M.D.

DNA Konzentration ↑
Glycosaminglycan ↓
Zellvitalität 39%



Arthroscopy 31, 6, 2015, 1077-83

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